EXHIBIT E

IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF SACRAMENTO

Coordination Proceeding)
Special Title (CRC 3.550))
) JCCP 4853
BUTTE FIRE CASES)
)

VIDEOTAPED DEPOSITION OF PG&E'S PERSON MOST QUALIFIED

(re: Information/Materials Provided to CPUC)

CHARLES FILMER

Sacramento, California

Tuesday, June 13, 2017

Reported by:

ELIZABETH A. WILLIS-LEWIS, RPR, CCRR, CLR

CSR No. 12155

Job No. 2610687B

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BY MR. CAMPORA: 12:38:12

Q. Do you yourself review the fire incident data? 12:38:12

A. Can you be more specific? 12:38:21

Q. Sure. Do you personally review the fire incident data? 12:38:23 12:38:25

A. So currently my job duties include preparing the annual report that goes to the CPUC regarding their fire incident data collection decision that came out in 2014. Prior to that I was involved in the vegetation management program from about 2007 to 2012 where I collected the investigation reports and aggregated some of the data onto spreadsheets for reporting purposes. 12:38:26 12:38:30 12:38:35 12:38:38 12:38:43 12:38:50 12:38:56

(Exhibit 829 was marked for identification.) 12:39:11

COURT REPORTER: 829. 12:39:14

BY MR. CAMPORA: 12:39:15

Q. Showing you what we have marked as Exhibit 829. It is dated 7 February 2013. It is 11 pages long and the first Bates number is JCCP 136135. 12:39:15 12:39:22 12:39:27

A. Um-hum. 12:39:31

Q. Is this a document you have seen before, sir? 12:39:31

A. Yes. 12:39:33

Q. Did you prepare this document? 12:39:34

A. I did. 12:39:35

Q. Did anyone else contribute in preparing this document? 12:39:35 12:39:39

A. I mean the data, the raw data, was provided by others but the report itself was primarily myself. 12:39:39 12:39:47

Q. Okay. And what was your purpose in preparing this document? 12:39:52 12:39:54

A. It was to be a multi-year summary of data related to the fire incident information. 12:39:55 12:40:01

MS. GOUGH: For the record, this document at PG&E JCCP 136135 has a stamp on it, "Attorney-client privileged," and we are not claiming attorney-client privileged as to this document. 12:40:06 12:40:09 12:40:14 12:40:17

BY MR. CAMPORA: 12:40:19

Q. As part of this document in this analysis did you try to determine which of the fires had been avoidable? 12:40:19 12:40:23 12:40:27

MS. GOUGH: Vague. Overbroad. 12:40:31

BY MR. CAMPORA: 12:40:32

Q. Do you understand my question, sir? 12:40:32

A. Yeah. I am just -- it's been a long time since I've looked at this. Please restate the question. 12:40:34 12:40:37

Q. Sure. In doing this review, summary and analysis did you attempt to determine what percentage of the fires that were a result of tree-line contact had been avoidable? 12:40:40 12:40:43 12:40:46 12:40:51

A. I think the answer is no. 12:40:54

Q. Okay. To your knowledge did anybody at PG&E 12:40:56

between 2007 and 2012 review the fire incident reports to determine what percentage, if any, of any of those fires had been avoidable? 12:41:00 12:41:05 12:41:09

MS. GOUGH: Assumes facts. Lacks foundation. 12:41:11

THE DEPONENT: I -- I don't know what the answer to that is. 12:41:14 12:41:16

(Exhibit 830 was marked for identification.) 12:41:30

BY MR. CAMPORA: 12:41:32

Q. Just so we have a clear record, Exhibit 829 is a true and correct copy of the document you prepared as part of your work at PG&E, correct? 12:41:32 12:41:34 12:41:35

A. Yes. 12:41:47

Q. Okay. Showing you what we have marked as Exhibit 830, that's an e-mail dated January 21st, 2011, from you to Barbara Clement, Daran Santi and Steven Tankersley. Correct? 12:41:47 12:41:51 12:41:59 12:42:04

A. Yes. 12:42:05

Q. With a copy to Peter Dominguez, correct? 12:42:09

A. That's right, um-hum. 12:42:13

Q. This is a true and correct copy of an e-mail you wrote? 12:42:14 12:42:17

A. Yes. 12:42:18

MR. CAMPORA: And it says, "Attorney-client privilege." And, Ms. Gough, you are waiving the privilege as to this document? 12:42:18 12:42:19 12:42:21

MS. GOUGH: No. We are not claiming a privilege as to the documents that have been produced for the deposition today that say "attorney-client privilege." So there is other documents that also say "for attorneys' eyes" and we have reviewed those and we are not claiming a privilege as to them, including this document. 12:42:23 12:42:25 12:42:27 12:42:30 12:42:32 12:42:35 12:42:39

MR. CAMPORA: Okay. 12:42:39

BY MR. CAMPORA: 12:42:40

Q. All right. So this one says, "Attached below is a summary and analysis of VM fire incidents that have occurred over the last four years." That's what you wrote? 12:42:40 12:42:43 12:42:47 12:42:50

A. Right. 12:42:50

Q. It says, "A few key points." Bullet point number 1, "VM fire incidents range from 50 to 100 per year." Did I read that correct? 12:42:51 12:42:54 12:42:59

A. That's correct. 12:43:01

Q. Okay. In what area was that limited to? 12:43:02

A. That would be system-wide. 12:43:05

Q. Okay. So when you say "VM fire incidents," are you talking about only significant fires or all fires? 12:43:06 12:43:10

A. Well, these would be all the fires that there were those fire incidents reports on -- the VM fire incident reports on. 12:43:14 12:43:19 12:43:23

Q. So it is your testimony when you did the review of those fires for the four years -- which I take it would be from 2007 through 2010? 12:43:23 12:43:25 12:43:29

A. Yeah, that sounds right. 12:43:33

Q. Okay. That there were only 50 to 100 incidents per year system-wide for PG&E? 12:43:38 12:43:41

A. Well, like I said, that was -- that would be the count per year of fire incident investigations I had. 12:43:44 12:43:50 12:43:55

Q. Okay. Well, it doesn't say "fire incident investigations." That's why I am asking. 12:43:57 12:43:59

A. Yeah. 12:44:01

Q. It says, "VM fire incidents range from 50 to 100 per year." Is it your testimony that PG&E was only having 50 to 100 vegetation management incidents per year between 2007 and 2010? 12:44:02 12:44:06 12:44:11 12:44:14

A. I'm saying that there were between -- in a range of 50 to 100 investigation reports that the vegetation management program had of ignitions that were related to trees. 12:44:19 12:44:23 12:44:29 12:44:37

Q. Okay. So just -- so it doesn't say "investigation reports." That's why I am asking. 12:44:38 12:44:43

A. No, I understand. 12:44:44

Q. So what you are saying is this should say that we have 50 to 100 incident reports per year related to 12:44:45 12:44:49

trees? 12:44:54

MS. GOUGH: Argumentative as to "should say." 12:44:54

BY MR. CAMPORA: 12:44:56

Q. Do you know how many fires they actually had 12:44:56

system-wide? 12:44:59

MS. GOUGH: Vague. 12:45:00

BY MR. CAMPORA: 12:45:01

Q. Per year? 12:45:01

MS. GOUGH: Vague. 12:45:02

THE DEPONENT: I am not sure I understand who 12:45:03

"they" is. 12:45:04

BY MR. CAMPORA: 12:45:05

Q. Well, I am asking did PG&E have 50 to 100 fires 12:45:05

per year system-wide between 2007 and 2010? 12:45:11

MS. GOUGH: Vague. 12:45:15

THE DEPONENT: I can't answer that. I can 12:45:16

answer what investigation reports -- 12:45:19

BY MR. CAMPORA: 12:45:22

Q. Okay. 12:45:22

A. -- you know, the range we had of those. 12:45:23

Q. So there were 50 to 100 investigation reports 12:45:25

per year between 2007 and 2010? 12:45:28

A. Yes, because that would be the basis for making 12:45:32

that range. 12:45:34

Q. All right. Then it says, "During the fire 12:45:35

Attorney – Client Privileged
Pacific Gas and Electric

Summary and Analysis of Vegetation-related Fire Incidents on PG&E Electric Powerlines

2007–2012

Prepared by
Charles Filmer

7 February 2013

Attorney – Client Privileged

Pacific Gas and Electric

Records for vegetation-related fire incidents associated with PG&E's overhead electric powerlines that occurred during 2007–2012 are summarized and analyzed below. A fire incident is where ignition of ground vegetation or structures occurs. Conclusions are based on limited information and should be considered preliminary.

A. Ignitions by cause and type of line involved

Ignition causes are defined as follows:

- Growth-related: Tree grew into contact with line or close enough to cause flashover.
- 3rd Party: Homeowner, private tree trimmer, etc., cuts a tree into the line.
- VM Contractor: A Vegetation Management Program tree contractor causes the ignition.
- Bark Shedding: Almost invariably, this is shedding bark blown from a eucalyptus.
- Palm Frond: Almost invariably, this is a dead frond blown from a fan palm.
- Branch Failure: Branch breaks and falls onto line.
- Trunk Failure: Trunk breaks and falls onto line.
- Root Failure: Tree uproots and falls onto line.
- Other: Unusual situations.

Over 85% of vegetation-related fire incidents involve high-voltage distribution (Table 1): Less than 2% of these ignitions were related to trees growing close to the powerlines, whereas almost 90% were related to tree failures (branch, trunk, and root failures).

About 8% of all ignitions are human caused: 3rd Party or VM Contractor. There were no records of ignitions related to compliance with Public Resources Code 4292 (Vegetation Control).

Growth-related ignitions on high-voltage distribution and transmission are rare: none occurred in 2010 or 2011. The growth-related ignitions on low-voltage distribution involved trees grown close to the line; however, these would not have been considered regulatory compliance violations, because strain or abrasion was not reported. Many were related to open-wire secondary.

Table 1. Ignitions by cause and type of line involved (2007–2012)

Cause	Down	Phone	Lo-voltage Distribution**	Hi-voltage Distribution	Trans-mission	Total
Growth-related			22	6	1*	29
3rd Party		1	1	21		23
VM Contractor			1	6	2	9
Bark Shedding				1		1
Palm Frond				1		1
Branch Failure		1	13	139	1	154
Trunk Failure	1		8	135	2	146
Root Failure				36	2	38
Other			1	6		7
Total	**1**	**2**	**46**	**351**	**8**	**408**

*Flower stalk of century plant (2008). ** Includes service drops.

Virtually all of the high-voltage distribution ignitions also involved an outage, whereas about one-quarter of the low-voltage distribution ignitions did not result in an outage record. However, five of the six growth-related ignitions on high-voltage distribution did not cause an outage (Table 2):

Table 2. Growth-related ignitions on high-voltage distribution (2007–2012)

Div	Circuit	Date	Area	ILIS Log #	Tree	Fire Size
SI	Penryn 1103	05/24/07	SRA	07-0031231	Century Plant	≤ 0.01 acres
NV	Corning 1102	06/12/07	LRA	No Record	Date palm	≤ 0.1 acres
NV	Corning 1102	06/12/08	SRA	No Record	Gray pine	7,783 acres
NV	Orland B 1101	07/06/08	SRA	No Record	Valley Oak	1.4 acres
DA	Hicks 1116	09/18/09	LRA	No Record	Date Palm	≤ 0.01 acres
NC	Philo 1102	10/01/12	SRA	No Record	California Bay	250 acres

B. Ignitions by responsibility area and type of line involved

About 80% of the high-voltage distribution ignitions were in SRA, but only about 40% of the low-voltage ignitions were in SRA (Table 3).

Table 3. Ignitions by responsibility area and type of line involved (2007–2012)

Area	Down Guy	Phone Line	Lo-voltage Distribution	Hi-voltage Distribution	Trans-mission	Total
LRA		1	27	69	2	99
SRA	1	1	19	282	6	309
Total	1	2	46	351	8	408

C. Fire size of ignition

Ignitions usually resulted in very small fires (Table 4). Over 60% of ignitions resulted in fires less than or equal to one-tenth of an acre. Significant damage to structures is rare.

Table 4. Fire size of ignition by type of line involved (2007–2012)

Fire Size	Down Guy	Phone Line	Lo-voltage Distribution	Hi-voltage Distribution	Trans-mission	Total
≤ 0.01 acres		1	25	133	3	162
> 0.01 to ≤ 0.1 acres		1	8	81	2	92
> 0.1 to ≤ 1.0 acres	1		8	75	1	85
> 1.0 to ≤ 10 acres			4	49	2	55
> 10 to ≤ 100 acres				9		9
> 100 to ≤ 1000 acres			1	3		4
7,783 acres				1		1
Total	1	2	46	351	8	408

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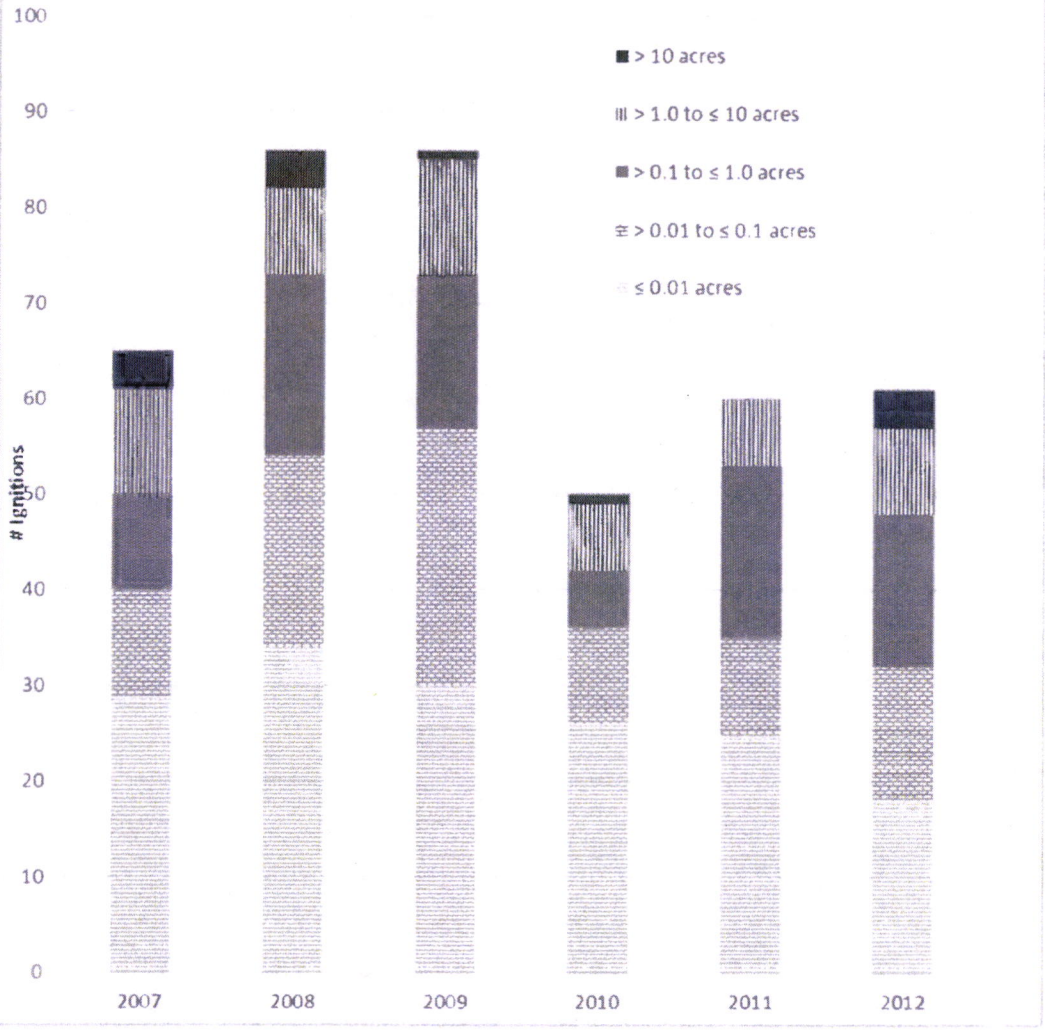
Figure 1 presents the number of ignitions each year during 2007–2012 categorized by the resulting fire size. There were 408 ignitions from all causes during this six-year period, and the annual range was 50–86.

Figure 1. VM ignitions categorized by resulting fire size



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There were 69 ignitions that resulted in fires that burned more than one acre (Table 5), and 48 of these resulted from tree failures onto high-voltage distribution during May–October. About 85% of fires that burned more than one acre occurred in SRA.

Table 5. Ignitions that resulted in fires that burned more than one acre (2007–2012)

Div	Circuit	Area	Cause	Tree	#Acres	Line*	Date
NV	Corning 1102	SRA	Growth-related	Gray Pine	7,783	PRI	06/12/08
LP	Zaca 1102	SRA	Other**	Coast Live Oak	710	PRI	10/21/07
DI	Clayton 2212	SRA	Branch Failure	Gray Pine	375	PRI	08/24/10
NC	Highlands 1103	SRA	Other***	Valley Oak	300	SEC	10/18/12
NC	Philo 1102	SRA	Growth-related	California Bay	250	PRI	10/01/12
SO	Rincon 1103	SRA	Trunk Failure	Tan Oak	75	PRI	05/15/08
SI	El Dorado PH 2101	SRA	Trunk Failure	Ponderosa Pine	67	PRI	05/15/08
SI	Narrows 2102	SRA	Trunk Failure	Live Oak	30	PRI	05/21/08
SI	Diamond Springs 1105	SRA	Root Failure	Gray Pine	23	PRI	08/16/12
NV	Wyandotte 1107	SRA	Branch Failure	Gray Pine	22	PRI	07/25/07
SI	Diamond Springs 1105	SRA	Root Failure	Gray Pine	20	PRI	08/04/07
NB	Calistoga 1101	SRA	Root Failure	Valley Oak	20	PRI	06/18/12
ST	Pine Grove 1102	SRA	Branch Failure	Black Oak	14	PRI	07/09/09
NB	Pueblo 2102	LRA	Branch Failure	Valley Oak	13	PRI	06/05/07
NV	Caribou-Table Mt. 230	SRA	VM Contractor	Sugar Pine	11	T-line	08/17/11
SO	Fort Ross 1121	SRA	Root Failure	Bishop Pine	10	PRI	04/01/09
NB	Bahia 1102	LRA	Branch Failure	Blue Gum	10	PRI	07/15/10
ST	Pine Grove 1102	SRA	Branch Failure	Black Oak	9	PRI	09/10/11
NV	Paradise 1103	SRA	Root Failure	Gray Pine	6	PRI	05/23/07
NC	Fruitland 1142	SRA	Trunk Failure	Coast Redwood	6	PRI	08/21/12
CC	Los Ositos 2103	SRA	Trunk Failure	Coast Live Oak	5	PRI	09/29/10
ST	Calaveras Cement	SRA	Branch Failure	Valley Oak	5	PRI	09/01/11
NV	Stillwater 1101	LRA	Root Failure	Gray Pine	5	PRI	06/16/12
NB	Calistoga 1101	SRA	3rd Party	Pine	5	PRI	06/27/12
SO	Santa Rosa 1103	LRA	Growth-related	Maple	4.0	SEC	06/05/07
NB	Basalt 1106	LRA	Branch Failure	Eucalyptus	4.0	PRI	05/22/08
SO	Fort Ross 1121	SRA	Other****	Coast Redwood	4.0	PRI	06/17/08
NC	Redbud 1101	SRA	Branch Failure	Valley Oak	4.0	PRI	10/03/09
SI	Apple Hill 2102	SRA	Trunk Failure	Ponderosa Pine	3.8	PRI	12/01/11
NB	Calistoga 1101	SRA	Branch Failure	Douglas Fir	3.8	PRI	05/23/12
SI	Apple Hill 2102	SRA	Trunk Failure	Ponderosa Pine	3.1	PRI	12/01/11
SO	Fitch Mountain 1113	SRA	Trunk Failure	Tan Oak	3.0	PRI	06/13/09
SO	Sonoma 1104	SRA	Trunk Failure	Live Oak	3.0	PRI	07/09/09
FR	Wahtoke 1108	LRA	Trunk Failure	Italian Stone Pine	3.0	SEC	08/29/12
SO	Fitch Mountain 1113	SRA	Trunk Failure	Live Oak	3.0	PRI	07/22/07
NB	Silverado 2103	SRA	Branch Failure	Live Oak	3.0	PRI	08/10/07
SO	Fulton 1102	SRA	Trunk Failure	Live Oak	2.5	PRI	07/22/07
NV	Stillwater Station 1101	SRA	Trunk Failure	Black Oak	2.5	PRI	10/26/07

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NC	Philo Jct-Elk 60	SRA	Branch Failure	Black Oak	2.5	T-line	08/14/12
CC	Gabilan 1101	SRA	Branch Failure	Sycamore	2.4	PRI	08/07/12
SO	Sonoma 1105	SRA	Trunk Failure	Black Oak	2.3	PRI	11/29/09
YO	Woodward 2108	SRA	Root Failure	Gray Pine	2.0	PRI	05/06/09
NV	Panorama 1102	LRA	Trunk Failure	Valley Oak	2.0	PRI	07/13/09
NC	Laytonville 1102	SRA	Trunk Failure	Madrone	2.0	PRI	07/29/09
LP	Morro Bay 1101	SRA	Branch Failure	Blue Gum	2.0	PRI	08/28/09
NC	Hoopa 1101	SRA	Trunk Failure	Live Oak	2.0	PRI	09/05/11
YO	Curtis 1704	SRA	Trunk Failure	Ponderosa Pine	2.0	PRI	12/01/11
NB	Konocti 1102	SRA	Root Failure	Knobcone Pine	2.0	PRI	05/01/12
NB	San Rafael 1104	SRA	Growth-related	Oak	2.0	SEC	05/21/08
SO	Fort Ross 1121	SRA	Trunk Failure	Black Oak	2.0	PRI	07/16/08
NB	Bolinas 1101	SRA	Branch Failure	Blue Gum	2.0	PRI	07/24/08
SO	Rincon 1103	SRA	Trunk Failure	Douglas Fir	2.0	PRI	09/03/08
SO	Fitch Mountain 1113	SRA	Trunk Failure	Black Oak	2.0	PRI	08/29/09
NV	Corning 1101	SRA	Branch Failure	Gray Pine	2.0	PRI	06/11/10
NC	Konocti 1102	SRA	3rd Party	Pine	2.0	PRI	10/28/07
CC	Camp Evers 2105	SRA	Root Failure	Acacia	1.8	PRI	05/22/08
YO	Curtis 1704	SRA	Branch Failure	Black Oak	1.8	PRI	08/30/10
SI	Grass Valley 1103	SRA	Branch Failure	Gray Pine	1.8	SEC	06/27/10
NB	Silverado 2102	SRA	Branch Failure	Live Oak	1.7	PRI	05/15/08
SO	Monte Rio 1111	SRA	Trunk Failure	Bay	1.7	PRI	07/06/07
SO	Cotati 1105	SRA	3rd Party	Pine	1.7	PRI	08/28/07
NB	North Tower 1103	LRA	Branch Failure	Eucalyptus	1.7	PRI	07/03/09
NC	Geyserville 1101	SRA	Branch Failure	Blue Oak	1.7	PRI	08/19/10
PE	Half Moon Bay 1103	SRA	Branch Failure	Monterey Cypress	1.5	PRI	08/17/10
NV	Orland B 1101	SRA	Growth-related	Valley Oak	1.4	PRI	07/06/08
YO	Mariposa 2102	SRA	Branch Failure	Gray Pine	1.3	PRI	06/19/09
SO	Fort Ross 1121	SRA	Trunk Failure	Coast Live Oak	1.3	PRI	07/02/07
CC	Green Valley 2103	LRA	Branch Failure	Blue Gum	1.3	PRI	11/05/12
SO	Fort Ross 1121	SRA	Root Failure	Monterey Pine	1.1	PRI	10/05/07

* SEC = low-voltage distribution, PRI = high-voltage distribution, and T-line = transmission.
** Santa Ana winds blew branch onto powerlines.
*** Branch fell on service drop, which got pinned to top of shed.
****Conductor blew ten feet to side on long canyon span and became hung up in the top of a healthy Redwood causing sparks and a brush fire.

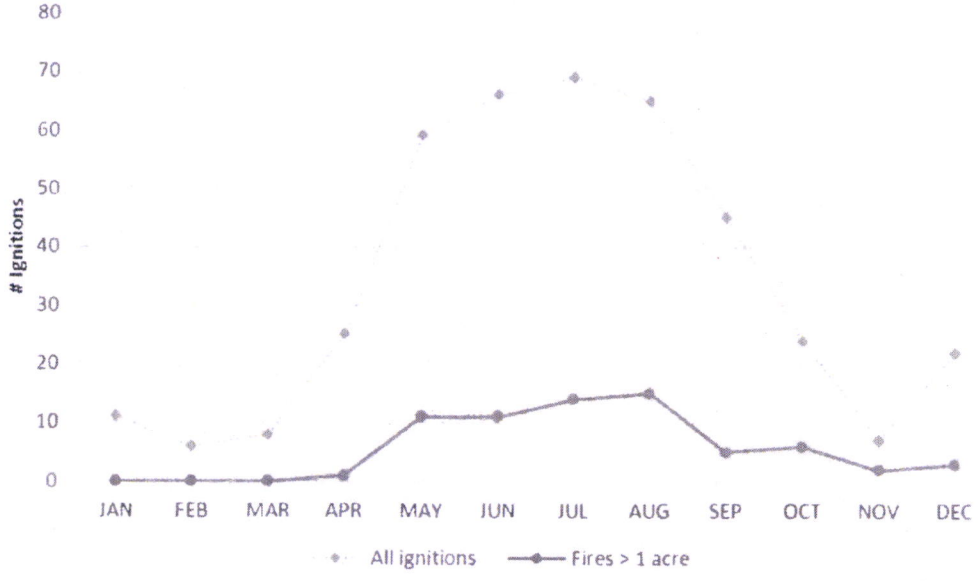
D. Ignitions by time of year

Ignitions were most frequent during the conventional fire season of mid-April through October, and virtually all of the 69 fires that burned more than one acre occurred during the six-month period of May–October (Fig. 2). There were 408 ignitions from all causes during 2007–2012.

Three weather events accounted for 56 ignitions during the last six years:

1. Thirty ignitions occurred during the unusually dry, windy week of May 14 to May 22, 2008. Seven of these ignitions resulted in fires greater than one acre burned.
2. Twelve ignitions occurred on April 14, 2009, including two on transmission. This was a very windy day in the northern half of the service territory. None of these ignitions resulted in fires greater than one acre burned.
3. Fourteen ignitions occurred on December 1, 2011, and three of these ignitions resulted in fires between two and four acres. Extremely strong, dry winds swept across California during November 30 to December 1, 2011, well after the fire season.

Figure 2. Ignitions during 2007–2012 by month



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E. Failure profile of typical tree that causes ignition

No ignitions during the May–October fire season were caused from bark shedding or detached palm fronds, whereas about 4% of outages on high-voltage distribution during this period were from these two causes.

Tree failures on high-voltage distribution that cause ignitions during May–October tend to involve larger tree parts as compared to tree failures that cause outages:

- A higher percentage of ignitions are caused by trunk failures (Figure 3).
- The average diameter of branch failures that cause ignitions is about 70% greater (Table 6).
- Tree failures that cause ignitions are twice as likely to be associated with wire on ground as compared to tree failures that cause outages, which suggests heavier tree parts (Table 7).

Figure 3. Tree failure profile on high-voltage distribution during fire season (2007–2012)

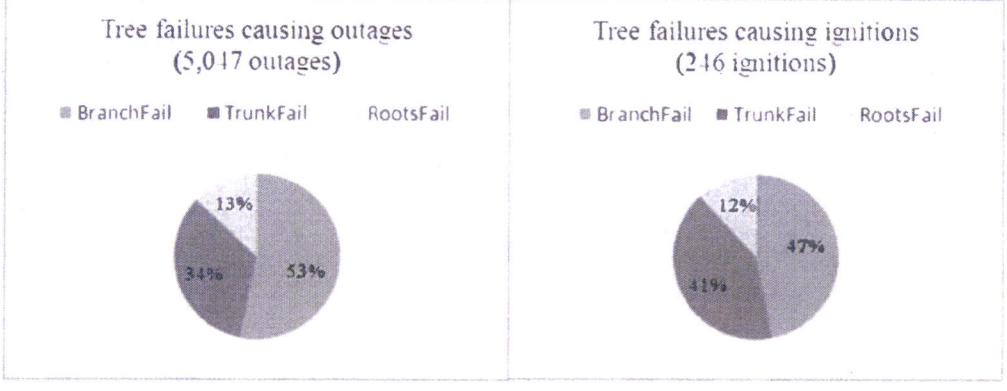

Table 6. Branch failures on high-voltage distribution during May–October 2007–2012		
	Diameter at break	Number of incidents
Branch failures causing outages	7.0 inches (avg.)	2,677 outages
Branch failures causing ignitions	11.9 inches (avg.)	115 ignitions

Table 7. High-voltage distribution with wire on ground during May–October 2012			
	Number of WOGs	Number of incidents	%WOG
Tree failures causing outages*	324	757	43%
Tree failures causing ignitions	43	51	84%

*OUTAGE DB

F. Ignitions by division

Divisions with relatively high percentages of tree failures on high-voltage distribution during May–October resulting in ignitions included NV, SI, NB, NC, LP, ST, and YO (Table 8). North Coast Region had about 40 % of all ignitions, and the frequency of ignitions per line mile in the North Coast Region was three times the system-wide average. Relatively few ignitions occurred in the Bay Area (other than North Bay) or the San Joaquin Valley Region.

Systemwide, almost 5% of these tree failures resulted in ignitions, and almost 20% of these ignitions resulted in fires greater than one acre. Therefore, there is approximately a 1% probability that a tree failure onto high-voltage distribution during May–October will result in a fire greater than one acre. The probability is highest in the three North Bay counties: almost 3%.

Table 8. Ignitions from tree failures on high-voltage distribution during May–October (2007–2012)

Division / [Region]	Total # Outages*	Total # Ignitions*	# fires > 1.0 acre	Miles of OH High-voltage Distribution	Outages per mile* (x1000)	Ignitions per mile* (x 1000)	% Outages resulting in Ignitions
NC, less SO	712	42	5	7,531	95	5.6	5.9%
NB + SO	776	52	21	8,149	95	6.4	6.7%
[North Coast Region]	**1,488**	**94**		**15,680**	**95**	**6.0**	**6.3%**
DI	135	3	1	2,464	55	1.2	2.2%
EB	72	0		1,794	40	0.0	0.0%
MI	43	1		2,215	19	0.5	2.3%
SF	14	0		627	22	0.0	0.0%
PE	204	5	1	2,276	90	2.2	2.5%
DA	213	6		1,868	114	3.2	2.8%
SJ	74	1		2,488	30	0.4	1.4%
[Bay Area, less NB]	**755**	**16**		**13,732**	**55**	**1.2**	**2.1%**
CC	981	26	3	7,173	137	3.6	2.7%
LP	131	8	1	6,358	21	1.3	6.1%
[Central Coast Region]	**1,112**	**34**		**13,531**	**82**	**2.5**	**3.1%**
NV	402	32	6	12,045	33	2.7	8.0%
SI	503	37	4	10,807	47	3.4	7.4%
SA	134	5		6,304	21	0.8	3.7%
[Sacramento Valley]	**1,039**	**74**		**29,156**	**36**	**2.5**	**7.1%**
ST	169	9	3	8,719	19	1.0	5.3%
YO	199	11	3	14,101	14	0.8	5.5%
FR	249	7		13,901	18	0.5	2.8%
KE	36	1		7,876	5	0.1	2.8%
[San Joaquin Valley]	**653**	**28**		**44,597**	**15**	**0.6**	**4.3%**
Total	**5,047**	**246**	**48**	**116,696**	**43**	**2.1**	**4.9%**
	* Caused by tree failures (root, trunk, and branch failures).						

G. Tree species ranked by risk

Table 9 lists tree species ranked by fire risk for tree failures that occurred during May–October on high-voltage distribution during 2007–2012: The percentage of outages caused by tree failures during May–October that resulted in fires greater than 0.1 acres is calculated for each species to rank them for relative fire risk in column 9.

Gray pine is a high-risk species for causing catastrophic fire. Gray pine caused six of the eighteen fires listed in Table 5 associated with tree failure that burned more than five acres. It grows in foothill woodlands and chaparral, and fires related to gray pine are concentrated in the SRA portions of North Valley, Sierra and Yosemite Divisions. Gray pine located in high-risk areas that are tall enough to hit powerlines should be considered for removal or lowering in height to protect facilities.

Bishop pine, blue oak, live oak, ponderosa pine, valley oak, black oak, and blue gum are intermediate in risk. Density of each species in areas where fires can easily start and propagate probably accounts for the relative risk.

Above-average percentages of blue oak, valley oak, and blue gum tree failures occur during May–October (Table 9, column 1). As the failure profile of these three species is mostly branch failures, it could be cost effective fire-risk reduction work to remove overhanging branches of these species in high-risk areas. Conversely, ponderosa pine and bishop pine fail at below-average percentages during May–October, so targeting these two species for fire-risk reduction work may be of limited effectiveness.

Coast redwood is one of the several species causing the most outages during May–October. However, there are relatively few ignitions related to coast redwood. Coast redwood occurs in native stands in relatively moist, coastal zones or in planted landscapes: it presents a low risk for catastrophic fire.

Other species not listed in Table 9 likely present average to low risk for catastrophic fire.

H. Further study needed

Live oak was associated with seven fires greater than one acre in size, which is almost as many as gray pine (Table 5). The term "live oak" is used to designate two or three different species of evergreen oak in Vegetation Management's databases: canyon live oak, interior live oak, and occasionally coast live oak. Ignitions involving "live oak" in the future should be clarified to identify the correct oak species, so risk-reduction work can be properly targeted.

Low-voltage distribution with open-wire construction should be further evaluated for fire risk from growth-related ignitions.

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Table 9. Tree species ranked by risk - Outages & Ignitions caused by tree failures onto high-voltage distribution during May–October (2007–2012)

	1	2	3	4	5	6	7	8	9
Tree	% May–October*	# Branch Failure	# Trunk Failure	# Root Failure	Total # Failures	Total # ignitions	# fires > 0.1 acre**	# fires > 1.0 acre	Risk Rank ***
High-risk									
Gray Pine	30%	89	65	27	181	33	20	9	0.110
Intermediate-risk									
Bishop Pine	14%	9	7	6	22	4	2	0	0.091
Blue Oak	44%	17	13	10	40	3	2	1	0.050
Live Oak	31%	44	109	13	166	13	8	7	0.048
Ponderosa Pine	8%	20	61	13	94	7	3	1	0.032
Valley Oak	53%	290	77	30	397	24	12	5	0.030
Black Oak	36%	158	226	60	444	38	13	6	0.029
Blue Gum	39%	237	37	21	295	20	8	3	0.027
Average-risk									
Douglas Fir	21%	153	95	68	316	13	6	2	0.019
Tan Oak	31%	18	209	40	267	13	5	2	0.019
Coast Live Oak	37%	45	139	34	218	7	4	2	0.018
Eucalyptus	40%	143	26	11	180	9	3	2	0.017
Sycamore	60%	52	10	2	64	3	1	1	0.016
Willow	54%	21	36	13	70	4	1	0	0.014
Monterey Cypress	22%	62	17	2	81	1	1	1	0.012
Monterey Pine	32%	159	87	48	294	12	3	1	0.010
Low-risk									
California Bay	27%	15	61	30	106	2	1	1	0.009
Madrone	29%	17	67	23	107	6	1	1	0.009
Cottonwood	56%	93	17	31	141	3	1	0	0.007
Coast Redwood	22%	347	69	23	439	5	2	1	0.005
Knobcone Pine		4	4	3	11	1	1	1	
Acacia	21%	3	11	6	20	1	1	1	
Sugar Pine		3	4	3	10	1	1	0	
Coulter Pine		1	0	0	1	1	1	0	
Chinquapin, Golden		0	1	0	1	1	1	0	
Black Walnut		18	1	3	22	1	1	0	
All other species		659	263	138	1060	20	0	0	
All	31%	2,677	1,712	658	5,047	246	103	48	0.020

*Percentage of year-round tree failures that occurred during May–October of 2007–2012. **Includes fires > 0.1 acre and fires > 1.0 acre. *** Percentage of tree failures that resulted in fires greater than 0.1 acre